DOCUMENT RESUME

ED 337 435 SP 033 326

AUTHOR Sparks-Langer, Georgea Mohlman; And Others
TITLE Promoting Cognitive, Critical, and Narrative Reflection.
PUB DATE Apr 91
NOTE 31p.; Paper presented at the Annual Meeting of the American Educational Research Association (Chicago, IL, April 3-7, 1991).
PUB TYPE Speeches/Conference Papers (150) -- Information Analyses (070)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Cognitive Processes; Critical Thinking; *Decision Making; Elementary Secondary Education; Higher Education; Inservice Teacher Education; Literature Reviews; Moral Values; Personal Narratives; Preservice Teacher Education; Teacher Attitudes; *Teacher Improvement; *Thinking Skills; Value Judgment
IDENTIFIERS *Reflective Thinking

ABSTRACT

The paper reviews literature on three orientations to teachers' reflective thinking (cognitive, critical, and narrative). The cognitive approach includes studies of teachers' information processing and decision making, emphasizing how teachers make decisions. The critical approach has its roots in problem framing and ethical and moral reasoning. It stresses the substance of decisions made by examining teacher experiences, values, sociopolitical implications, and goals. The teacher narrative approach refers to teachers telling their own stories via naturalistic inquiry, case studies, and action research. The three aspects illustrate how the field of research on teaching is moving from a predominantly behavior-oriented paradigm of teaching to a reflective paradigm. The paper presents four studies of reflective thinking to illustrate what is being learned and promoted on the subject: (1) a description of prestudent teachers' reflective thinking; (2) a comparison of prestudent teachers' reflective thinking; (3) growth in inservice teachers' reflective thinking; and (4) growth in novice teachers' reflective thinking. Guided field experiences with writing, thought, discussion, and a coherent view of reflective thinking can help future teachers analyze and interpret classroom experiences. Teacher workshops and coaching develop the ability to use principles and context to explain their actions. An appendix provides more detail on the first study. (SM)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED337435

PROMOTING COGNITIVE, CRITICAL, AND NARRATIVE REFLECTION

by

Georgea Mohlman Sparks-Langer
Eastern Michigan University (EMU)

Amy B. Colton, Ann Arbor Public Schools
and EMU

Marvin Pasch, EMU

Alane Starko, EMU

Paper Presented at the Annual Meeting of the
American Educational Research Association
Chicago, IL

April, 1991

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

G. Sparks-Langer

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

S1033 326

BEST COPY AVAILABLE

Most cognitive researchers have not delved as deeply into the last two aspects of the knowledge base--contexts and educational purposes, ends, and aims. They tend to stick with what Van Manen (1977) might call the technical level of reflection where the purposes tend to remain unexamined. We will see later, however, that the narrative approach to reflection stresses the consideration of context factors, while the critical view emphasizes the questioning of the purposes, ends, and aims of education.

Another focus of cognitive research is the process of thinking. This includes how the knowledge base is organized. It is thought that information is organized into a network of related facts, concepts, generalizations, and experiences. These organized structures, called schemata, constitute the individual's comprehension of the world and allow a large body of information to be stored and accessed with enormous speed (Anderson, 1984; Berliner, 1986). Studies of novice and expert teachers' interpretations of classroom events have indicated that experts have deeper, more richly connected schemata to draw upon when making a decision. In contrast, novices tend to have leaner, less developed schemata, presumably because of a lack of experience (Leinhardt & Greeno, 1986).

Carter and her colleagues (1988) studied how experts, novices, and aspiring teachers perceive visual information about classrooms. She observed that experts were "better able to weigh the import of one piece of visual information against another, to form connections among pieces of information, and to represent management and instructional situations into meaningful problem units" (p. 25). This ability was attributed to the experts' more elaborate, complex, and interconnected schemata. These schemata first help determine which events merit attention, and second, trigger other relevant information from memory so the teacher can make sense of the experience and determine an appropriate response.

A key factor in expert practice appears to be "automaticity." Certain routines are automatically stimulated by a situation and put into action with little conscious attention by the teacher. This enables the teacher to perform some behaviors unconsciously while attending to those events that are more novel or important (Carter, et. al, 1988). It is believed that these automatic scripts for action are also stored as schemata.

Borko and Livingston (1989) compared the planning, teaching, and post-lesson reflections of novice and expert teachers in their program at University of Maryland. During the act of teaching, the novices encountered problems when attempts to be responsive to students led them away from scripted lesson plans. They appeared unable to hook back into their schema for the lesson, and had to re-create a meaningful plan on the spot--an unnerving process when over 20 students are waiting expectantly for the teacher to "get his act together." In contrast to the novices, experts were able to improvise quite naturally from sketchy plans, probably

PROMOTING COGNITIVE, CRITICAL, AND NARRATIVE REFLECTION

G.M. Sparks-Langer, A.B. Colton, M. Pasch, A. Starko
Eastern Michigan University

A shift towards an emphasis on reflective thinking has been apparent in supervision, staff development, and teacher education for the past few years. This paper briefly reviews literature related to three orientations to teachers' reflective thinking: cognitive, critical, and narrative. Next, we present four studies of reflective thinking that illustrate what we are learning about how to promote and measure teacher reflection.

It is difficult to pin down the exact meaning of the term "teacher reflection." Most who use the term would probably agree that the opposite of reflective action is the mindless following of unexamined practices or principles. But within that agreement, there is quite a range of opinion regarding what reflection is and what it looks like in action. We have come up with three ways of thinking about teacher reflection.

The first is the Cognitive Approach, which includes studies of teachers' information processing and decision making. The second, the Critical Approach, has its roots in problem framing and ethical and moral reasoning. The final approach to reflection, Teachers' Narratives, refers to teachers telling their own stories through naturalistic inquiry, case studies, and action research.

The three aspects of reflection described here illustrate how the field of research on teaching appears to be moving from a predominantly behavior-oriented paradigm of teaching to a reflective paradigm which includes the cognitive, critical, and narrative aspects of teacher thinking. Early research (e.g., Stallings, 1980) focused on technical teaching strategies with a later emphasis on the cognitive thinking processes behind those strategies (e.g., Clark & Peterson, 1986; Sparks, 1988). More recently, researchers have focused on teachers' thinking about decisions, values, dilemmas, ethics, and so on.

The Cognitive Approach

The cognitive approach to teacher reflection focuses on the knowledge and processes involved in teacher decision making. Shulman (1987) has described six categories of knowledge: content; pedagogy; curriculum; characteristics of learners; contexts; and educational purposes, ends, and aims. Shulman's idea of "pedagogical content knowledge," which encompasses the first three categories, refers to how teachers portray important ideas specific to their content. These representations or metaphors enable the teacher to convey complex ideas in ways that bring meaning to students.

because: (1) many of the routines and the content were available in memory as automatic scripts and (2) the rich schemata allowed the experts to consider the cues in the environment and quickly access appropriate strategies.

Schemata do not automatically appear in a teacher's mind; they are constructed through experience. Constructivist theory (Clark & Peterson, 1986) indicates that individuals are constantly constructing their own meaning out of what is perceived. This is a dual process of assimilation (fitting the new in with the old) and accommodation (changing the old mental organization to incorporate the new) (Piaget, 1978). Therefore, the experiences, values, and beliefs stored in memory have a big influence on how a new piece of information is perceived and interpreted. Such "culturally based filters" have been investigated by Hollingsworth (1990) and others (Ross,1990), with the result that teacher educators are now giving more attention to how preconceptions about the aims of education can influence what college students do (and do not!) learn from teacher education programs.

Lampert and Clark (1990) believe schema theory may give too little importance to context factors. They refer to "situated cognition," which suggests that knowledge is constructed through the interaction between the mind and the context surrounding the problem. Thus, rather than apply a generalized schema (learned rules, principles, or concepts) to a problem, teachers may make a case-by-case response to the particulars of a problem. If this is true, then greater opportunities need to be provided for future teachers to "anchor" their knowledge and experience in rich educational contexts.

One conclusion some have drawn from the cognitive research is that we should teach novices the schemata of experts. But, this would be ignoring the lessons learned from constructivism (we each must construct our own meaning) and from "situated cognition" (expert teachers probably draw on their own contextually developed knowledge and prior case-experience to develop their own wisdom of practice.) It would also, perhaps, short-circuit the development of professional judgement. While research can inform one about how complex and uncertain teaching is, it "cannot describe the sorts of decisions teachers should be taught to make in any particular situation" (Lampert & Clark, 1990, p. 29).

The Critical Approach to Reflection

While the cognitive approach emphasizes <u>how</u> teachers make decisions, the critical approach stresses the <u>substance</u> of those decisions by examining the experiences, values, sociopolitical implications, and goals of teachers. The literature on critical reflection derives mostly from a philosophical base. To understand this type of reflection, it is important to look at two orientations to reflective thinking, Schon's concept of reflective action (1983, 1987) and critical theory (McLaren, 1989; Tom, 1985). Both have enriched current views of teaching by highlighting the importance of teachers' thinking about the dilemmas of teaching and the social outcomes of education.

Schon (1983) first analyzed the work of architects and other professionals to see how they reflected on their actions. Surprisingly, he found little emphasis on traditional problem solving. Instead of using a rational process of selecting the best solution for an agreed-upon goal, these professionals engaged in an open debate of the nature of the decisions, the value of the goals, and the ultimate implications of the actions. Schon referred to this reflective dialog as problem setting. He also found among teachers and others an artistic comfort with ambiguity and no-one-right-answer thinking, and a recognition of the non-linear, uncertain complexity of professional practice.

Schon (1987) believes that while teachers acquire some professional knowledge from "packaged" educational principles and skills, the bulk of their learning comes through continuous action and reflection on everyday problems. Further, he contends that the information gained from this experience is often tacit and difficult to analyze. Schon does not refer to a cognitive "knowledge base" for teaching; rather, he refers to an "appreciation system." This system contains the teacher's repertoire of theories, practices, knowledge, and values which influence how situations are defined, what is noticed, and the kinds of questions and decisions teachers will form about particular actions.

By emphasizing the indeterminate, evaluation-laden nature of teacher decisions, Schon represents a link between the cognitive and critical approaches to reflection. Critical pedagogy has formed the base of many teacher educators' view of reflection (e.g., Smyth, 1989, Tom, 1985). According to McLaren (1989), "critical pedagogy attempts to provide teachers and researchers with a better means of understanding the role that schools actually play within a a race, class, and gender-divided society" (p. 163).

When teacher educators refer to helping teachers examine the ethical, moral, and justice issues in education, they refer to opening up a discourse about the role of schools in a democratic society. Teachers are urged to question common practices such as tracking, ability grouping, competitive grading, and behavioral control. They are encouraged to clarify their own beliefs about the purposes of education and to critically examine teaching methods and materials to look for the hidden lessons about equity and power that might lie therein. As in Schon's work, we see in critical pedagogy a reaction against what many have seen as an antiseptic, value-free, purely rational view of teaching and learning.

Critical theorists see knowledge as socially constructed, that is, constructed symbolically by the mind through social interaction with others. This knowledge is determined by the surrounding

culture, context, custom, and historical era (McLaren, 1989). In contrast to cognitive constructivism, this approach places more importance on life values and morals--for example, conceptions of justice, ideas about the purpose of the individual in a democracy, ethics related to treatment of students, and so on. All of these would be heavily dependent on the social milieu in which the teacher develops.

Schon (1987) has written extensively about the thinking processes of a reflective practitioner. To (over)simplify, as teachers describe, analyze, and make inferences about classroom events, they are creating their own pedagogical principles. These "short-range theories" (Smyth, 1989) help make sense of what is going on and guide further action.

Ross (1990) has extended the ideas of Schon, Van Manen (1977), and others into five elements of reflective thinking:

1) Recognizing an educational dilemma
2) Responding to a dilemma by recognizing both the similarities to other situations and the unique qualities of the particular situation
3) Framing and reframing the dilemma
4) Experimenting with the dilemma to discover the consequences and implications of various solutions
5) Examining the intended and unintended consequences of an implemented solution and evaluating the solution by determining whether the consequences are desirable or not. (p. 22).

Element five brings us to a key thinking process in critical pedagogy (McLaren, 1989), the examination of the relationship between power and knowledge. Knowledge should be examined "for the way it misrepresents or marginalizes particular views of the world" (p. 183). That is, many accepted facts and explanations are biased in favor of the group in power at the time when the ideas were formed. Teachers, then, need to see teaching and learning as a process of inquiry into the problematic by asking questions such as, If we use this process or content, what is the long-term effect on students' values, and thus on society? Through such questions emerges a "language of hope" for bringing about greater social equity.

Teachers' Narratives and Reflective Thinking

Cochran-Smith & Lytle (1990), in an article on teacher research, stated, "what is missing from the knowledge base of teaching, therefore, are the voices of the teachers themselves, the questions teachers ask, the ways teachers use writing and intentional talk in their work lives, and the interpretive frames teachers use to understand and improve their own classroom practices " (p. 2). She has stated the essence of the narrative approach to reflection. While this approach may include cognitive or critical aspects, the main emphasis is on teachers own descriptions of <u>the circumstances under which</u> they make decisions.

Many terms and concepts are joined together in this view of reflection: wisdom of practice (Shulman, 1987), craft knowledge (Leinhardt, 1990), art/aesthetics of teaching (Eisner, 1982; Kagan, 1988), teacher action research (Cochran-Smith & Lytle, 1990), and narrative inquiry (Connelly & Clandinin, 1990). The common thread through all of these is the emphasis on the validity of teachers' inferences drawn from their own experiences. This view is sympathetic with Schon's notion of "giving reason" because it is the teachers themselves whose voices comprise the story.

Most researchers who work in the Teachers' Narrative approach join with teachers to gain a deeper understanding of a particular phenomenon. For example, as part of a teacher reflection project at Eastern Michigan University, a small group of teachers and professors met for six half-days to explore the notion of reflection and to conduct inquiry into their own practice (Colton et al., 1989). One teacher's journal (Morris-Curtin, 1990) and final reflections provide a vivid story of the benefits gained from thoughtfully examining one's own surroundings:

> I think the most notable change for me was the ability to start backing away from the need to get an immediate solution to a problem. Instead, by using the problem solving/reflective framing format, I really feel like I'm giving the wealth of knowledge I possess about my profession a chance to come more fully into play...There is something magical and very personal in all of this. Like finally finding just the right word for a poem you've worked on for ages. Teaching, like any other art form, comes from a special place within us." (p. 5)

In one sense, the whole emphasis on critical and narrative teacher reflection could be seen as the "bridge" into a new way of thinking about research on teaching. Since many who study the process of learning to teach were trained in the quantitative/experimental research tradition, this can be a tough leap. Yet, as we have seen here, researchers have forged collaborations with teachers and are truly listening and learning from their stories (e.g., Huberman, 1990). More and more examples of such studies are beginning to appear in professional journals. Still, we are at the uncomfortable stage where many are writing about the need for this research and too few are doing it. Further, we find little evidence that teachers are being encouraged to see their own stories as valuable and to write for publication about their experiences.

Four Studies of Reflective Thinking

Our four studies range from a cognitive approach which tries to integrate a critical perspective to a more "narrative" longitudinal study of seven students as they move from pre-student teaching, through student teaching, and into their first year of teaching. All have resulted from our gaining federal funding from OERI in 1985 to create a pre-student teaching program that integrates reflective thinking into courses and field experiences. First we will describe that program (CITE), then we will present each of the four studies.

CITE, Collaboration for the Improvement of Teacher Education, is a collaboratively developed program that promotes reflection in elementary- and secondary-level students in a four-year undergraduate teacher education program at Eastern Michigan University. Structured field experiences, micro-teaching, one-week of classroom teaching, and journal and writing assignments in three courses (Social Foundations, Curriculum and Methods, and Measurement) help students analyze, question, and reflect on teaching actions, consequences, and moral/political outcomes.

Our earliest evaluation studies (Sparks, Colton, Pasch & Simmons, 1988) produced a framework for measuring and describing the type of reflective thinking displayed during a short interview about a recent teaching event. The Framework for Reflective Pedagogical Thinking (RPT) includes seven levels: 1 (no description), 2 (simple lay-person description), 3 (labeling of events with pedagogical concepts), 4 (explanation using only tradition or personal preference), 5 (explanation using pedagogical principles), 6 (explanation using pedagogical principles and context), and 7 (explanation with ethical/moral considerations). The progression in levels shows a growing sophistication of teachers' schemata (Leinhardt & Greeno, 1986) from technical concepts and rules to contextual and ethical thinking (Van Manen, 1977). (See appendix A for more detail on theoretical underpinnings of the RPT framework.)

Study #1: Description of Pre-Student Teachers' Reflective Thinking

Twenty-four CITE students were interviewed after teaching a one-week mini-unit, toward the end of the semester. The interviews were audiotaped and transcribed. Four researchers used the RPT framework to rate the transcripts independently and blindly; the interrater reliability was over .80 (with a disparity of one level as acceptable.) Of the 16 average and above average CITE students interviewed, ten were functioning at level 6, contextual thinking. Of the eight lower-achieving students, only one was functioning at this level. (For more detail on this study, see attached Journal of Teacher Education article in Appendix A.)

Study #2: Comparison of Pre-Student Teachers' Reflective Thinking

Grinberg (1989) contrasted the reflective thinking of a group of elementary and secondary CITE students (n=37) with a similar group taking Curriculum and Methods, but not enrolled in CITE (n=42). In place of the interview about events from the teaching week, all students were asked to respond in writing to two videotaped sequences of classroom teaching. They were asked to describe the event, identify the educational ideas, and make a generalization about the event as it related to other teachers, classrooms, or students.

Results. The students' responses were coded independently using the Framework for Reflective Pedagogical Thinking (RPT). The four coders demonstrated a reliablity of over .80. While there was no significant difference between the groups' reflective thinking scores at the beginning of the semester, significant differences were found at the end of the semester (M=4.74 sd=.65; M=3.86 sd=1.2, t=3.39, p=.01). Table 1 and Figure 1 present the data from this study.

Discussion. These results indicate that CITE students had significantly higher posttest reflective thinking scores and that there was an improvement in their scores from the pretest to the posttest. It is significant that the CITE students were closer to Level 5 where pedagogical principles are used to explain events. The non-CITE students were still below Level 4 where explanations are based on tradition, rules, or personal preference. Such thinking is likely to be less flexible and less adaptive to student needs.

It appears that in this sample at least, participation in a block of three courses with a structured field experience had a positive effect on the students' reflective thinking. The CITE program helped students analyze classroom events using educational principles and some contextual factors.

This finding supports the need for structured field experiences as well as the need for coordination of the content and field activities in teacher preparation programs that hope to promote cognitive reflective thinking. If we are to move future teachers toward autonomous reflective thinking, we must find ways to encourage causal thinking that is based on knowledge of students, teaching, and learning.

Study #3: Growth in Inservice Teachers' Reflective Thinking

In the fall of 1988, a study of teacher instructional decision making was included in the evaluation design of a 2-year staff development project in the Grand Rapids, Michigan Public Schools. The training was based on the theories and techniques popularized by Dr. Madeline Hunter. First-year content included such topics as brain hemisphericity, motivation theory, Bloom's Taxonomy of the Cognitive Domain, lesson design, dignifing students' errors, and reinforcement theory. In the second year, added topics included higher order thinking, using analogies and visual images to support abstract ideas, and utilizing student experiences to enhance meaning. The inservice program included lectures, group discussions, opportunities for practice with feedback in a simulated setting, and on-site coaching of teaching.

To implement the study, two "high risk" elementary schools were selected from an initial set of 12 such schools defined as having stable, low achieving academic profiles over the previous five years. Fifteen teachers in these two schools were included in the first year of the study; 12 of the 15 continued in the project the following year and thus became the second-year sample.

A time series of four interviews were conducted using the RPT Framework to structure the questions. The first interviews ("pretest") were held in September, 1988, prior to the onset of the workshops. The second interviews ("Interim") were conducted after the completion of training and prior to the onset of on-site coaching. The third interviews ("Posttest") were held in June, 1989, after the first year of inservice. The final interviews ("Final") were conducted in May, 1990, after the second year of inservice workshops.

Results. The interview transcripts were examined and rated by six members of the research team who had been trained in the use of the coding scheme. The Final interview transcripts were rated by four of the six research team members. Paired t-tests were employed to compare the differences between the RPT Pretest mean (4.70) and the Interim mean (4.64); the Pretest mean (4.70) and the Posttest mean (5.05); the Pretest mean (4.70) and the Final mean (5.43); and finally, the Posttest mean (5.00) and the Final mean (5.43). These comparisons are shown in Tables 2 and Figure 2. There were no statistical differences (p=.05) between the Pretest and Interim scores. However, statistically significant differences were found between the Pretest and Posttest as well as between Pretest and Final Test and between the Posttest and the Final Test.

Discussion. The mean level increase between the Pretest (4.70) and the Final Test (5.43) represents an increase of three-quarters of a step in the RPT Framework. This move indicates an average change from a dependence on tradition and authority to the use of appropriate pedagogical principles to explain instructional events. This change could be seen as an enrichment of the depth and complexity of the schemata these teachers used for teaching decisions. Such sophistication of thought is what we are striving for as we conduct staff development programs. Teachers who can make decisions in a flexible and thoughtful way will probably produce more thoughtful students.

The absence of apparent differences between the Pretest and Interim interviews (conducted after training, but before coaching) and the clear increase in RPT scores after coaching (Posttest and Final) suggests that behavioral modeling, practice, and coaching are critical to not only implementation of skills (Joyce & Showers, 1983), but also to how teachers analyze and interpret classroom events--reflective thinking (Simmons & Sparks, 1985; Sparks, 1983). The fact that the scores continued to rise throughout the second inservice year (as seen in the Final score) may indicate that programs hoping to promote reflective thinking may need to be longer than just one year.

While there was an increase in teachers' cognitive reflection to a level where more principles and context factors were taken into consideration when explaining instructional events, little evidence is seen of critical reflection (Level 7). This is probably because critical thinking was not an explicit goal of the Madeline-Hunter-based inservice model.

Study # 4: Growth in Novice Teachers' Reflective Thinking

The fourth study, still in progress, is designed to follow the development of reflective thinking as students progress from undergraduate methods classes to student teaching to beginning teaching. Seven students from an elementary-level honors section of CITE were interviewed at the end of their CITE semester, after eight weeks
of student teaching, and again at the end of student teaching. It is planned to interview each subject again at the midpoint and end of their first year of teaching. Three subjects have graduated and are currently teaching. Their first-semester interviews have been completed and are summarized here. The remaining subjects graduated in December and hope to obtain their first teaching positions in fall of 1991.

Interviews at the end of the CITE semester were based on the Taxonomy of Reflective Pedagogical Thinking (RPT). The RPT interview was repeated after eight weeks of student teaching, and expanded to include open ended questions on the subjects' areas of concern and confidence, as well as a discussion of their predominant thoughts while planning and teaching. These topics without the RPT interview were repeated in subsequent interviews. The RPT section of the interviews was scored numerically as in studies one through three. Responses to open ended questions were reviewed for repeated themes and issues. While data analysis is still in progress, preliminary results are reported here.

Pre-Student Teaching Results. At the end of the CITE semester, the average RPT score for the seven honors pre-student teachers was 6.43. Students were considering the effects of principles and context on their educational decision making. They were also beginning to consider the ethical and moral aspects included in Level 7.

Student Teaching Results. After eight weeks of student teaching, one subject was at level five, two at level six, and four at level seven, about the same as at the end of the CITE semester. Over half the students were beginning to consider their educational practices in view of larger social, political, or ethical issues. These included the inequity of resources across school districts, the role of the community in shaping practice, educational opportunities for hospitalized children, and the complexities of finding "who you are as a teacher" in the midst of personal, school, and supervisor's values.

Open ended questions in subsequent interviews make it possible to examine not just the levels of reflection, but the topics on which subjects are actually reflecting. While data analyses are not complete, trends are appearing in the the teachers' reflective thinking and complex cognitive processes. Areas of potential concern for teacher educators can also be identified.

When student teachers were asked to describe areas of confidence, the most frequently mentioned topics were classroom management, the ability to plan effective lessons, and positive interpersonal relationships with children and adults. They described confidence in their abilities to perform in the traditional role of "teacher." This feeling was expressed by one subject who stated, "I know I can handle the teaching--it's just handling everything else involved in being a teacher".

Concerns varied enormously with the student teacher's satisfaction with the placement. These honors students did not feel comfortable with the cooperating teacher's methods or style described spending the large majority of their time "figuring out what she wants" and
trying to adapt to that style. The other students' most common area of concern was the identification and meeting of exceptional students' needs within the bounds of the regular classroom. Student teachers who were in classrooms with severe student problems (abuse, severe handicapping conditions, etc.) worried about meeting those needs. Those who were not, worried that they would not be prepared for such students on their own. Regardless of placement, student teachers were concerned with "time to do anything else", and the overwhelming demands on time and energy that would be made on them as beginning teachers.

In describing their areas of reflection while planning, the two topics most commonly described were "How can I make it interesting?" and "How long will it take?" Considerable amounts of time were spent planning activities that would be new, motivating, or exciting. Student teachers also described spending a great deal of planning time, considering the amount of time that would be needed, balancing time demands across days and subjects, and thinking ahead about alternate plans if they over or under estimated the time needed.

When asked about their thoughts while "on their feet", responses varied from the simple to the extremely complex. One student half-way through student teaching described her greatest concern as grammar. Her continuing monitoring of her own speech patterns left little room for other types of reflection. More common thought patterns among other students were "Are they getting it?" "Am I clear?" and "Are they on task?" These concerns can interact with attention to the lesson content in a network of enormous cognitive complexity.

One honors student at the end of student teaching described her thoughts while teaching.

> Several things at once. First the content. You're looking around to see who's paying attention. You're reading their faces, or their body language. If a kid is not paying attention you have going through your mind, "How am I going to get this kid back in the lesson without drawing attention to him or her?" A lot of times you have in your mind before you start the lesson where you are going to start and stop asking questions or when to get feedback. Sometimes you have to modify that. If they're starting to drift, you need to get them back on track. Ask them a few questions. Ask for a few suggestions. Have them ask questions. Something....There's times when it doesn't work. When do you call enough is enough? You can say, OK I understand they just come in from recess or we're having a movie this afternoon. When do you draw the line? So that's in there, too. Should I let this go or come down on them? I don't know if anyone ever knows the right answer.

The student teacher is considering the content, the need to keep individual students' attention, the need to get feedback to check understanding and increase student involvement, the optimal timing and type of feedback, and making management decisions, all at the same time.

Beginning Teaching Results. While data gathering on these former honors students is just beginning, trends are already emerging. Like student teachers, the topics and emphases of reflection during the first year of teaching are highly influenced by placement. One of the beginning teachers interviewed is assigned a class that contains all the students at that grade level who scored well below average on achievement tests, as well as most of the "behavior problems". The amount of time and mental energy that teacher puts into motivation and classroom management are very different from a teacher with fifteen students in a private Montessori school. The lack of specific curriculum, a three-grade span, and above average ability level in that class provide a different set of challenges.

All three beginning teachers described large amounts of time spent considering the cognitive, affective, and social needs of individual children. The private school teacher discussed more time spent in curriculum development and reflection about content than public school teachers whose content was perceived as defined by texts and curriculum guides.

The most powerful theme is that of feeling overwhelmed. Beginning teachers described thinking about their jobs day and night, worrying about their lack of financial resources (personal and school) for materials to meet students' needs, concern for the extraordinary circumstances of individual students' lives, and trying to do a "perfect lesson" for every subject every day.

Discussion. These beginning results raise several issues that may be considered by teacher educators. Teachers at all three levels described very little reflection about the nature, structure, or importance of content. Much more time was spent considering how to make content interesting than how to make it clear, or whether it was worthwhile. It is possible that such reflection does occur and was not elicited by the interviews. If it did not, is this due to lack of familiarity with content, lack of practice reflecting on content, or the perception that content is so pre-determined that reflection is of little value? Similar questions could be raised about the limited discussion of broad social, political, or ethical issues unless specifically cued. It would be interesting to interview a similar group of students who have taken CITE more recently, when both content analysis and curriculum ties to social issues have been strengthened. It is possible such changes may make a difference. It is also possible that the time demands and intensity of beginning teaching make any considerations beyond immediate needs seem superfluous.

Perhaps an even greater concern is the responsibility that falls on teacher educators who wish to develop reflection and cognitive complexity, who try to help students see the variety of factors that impact on student achievement and the variety of teaching strategies that are possible, and who encourage future teachers to pursue higher level goals and broad ethical considerations. It is essential that these complex and worthwhile goals be put into perspective with the realities of beginning teaching.

While it is crucial that beginning teachers know the complexity of their task, it is also important that they understand they will not be able to deal with everything at one time, all day long. Both student teachers and beginning teachers seemed enormously relieved to be reassured by the interviewer that no teacher does perfect lessons in every subject daily, keeps every child's attention every minute, or remembers everything they know about child development, classroom management, higher level thinking, learning styles, content analyses, questioning strategies, multi-cultural concerns, assessment techniques, etc. every minute of the school day. It is possible that such concerns may be particularly significant in teachers similar to the honors students studied here. Perfectionism is often seen in those of well above-average intellectual ability (Adderholt-Elliott, M., 1987).

Discussion and Educational Significance

While the framework for measuring reflective thinking and the studies themselves are of interest, it is our own developing conceptions of the meaning of reflection that has fascinated us.

--It appears that guided field experiences with writing, thought, discussion, and a coherent view of reflective thinking can help future teachers analyze and interpret their classroom experiences. Workshops and coaching over time develop in teachers the ability to use principles and context to explain their actions. Therefore, we feel fairly successful in promoting the cognitive/micro/technical aspects of teacher thinking.

--It is harder, however, to develop the critical reflection crucial for responsible professional practice. Most new teachers seem to be able to deal only with the immediate cognitive load of "What do I do tomorrow?" with little attention to student outcomes or broader ethical/moral aspects of teaching until the second or third year (Hollingsworth, 1990). (The four honors CITE students in Study #4 who reached Level 7 were among the first cohort studied who had a Social Foundations professor who emphaiszed critical pedagogy.) In the past two years, two new social foundations faculty members have helped the other CITE professors gain a broader critical view of schooling, which is now more apparent in all CITE courses. Our more current research will inform us about the developmental nature of critical reflective thought.

--While the cognitive-psychology notions of constructivism, schemata, automaticity, and metacognition have proved valuable to our development in understanding reflective thought, the cognitive view (in most cases) has been bereft of (1) the moral and philosophical aspects emphasized by the critical view and (2) the valuable insights of teachers themselves, provided by the narrative view. As we work with teachers on collaborative research programs, we are gaining a deeper appreciation for a "fleshed out" image of reflection that includes all three orientations. Study #4 reflects this perspective.

--We have re-framed the RPT Framework into two scales, one for cognitive reflection (Levels 1-6) and another for critical reflection (Level 7). The progression from Level 6 to 7 is probably not linear, nor is critical thinking necessarily dependent on cognitive reflection. The two constructs appear to be independent, at least at this point in our research.

--Until we gain a clearer understanding of the developmental nature of teachers' reflective thinking--cognitive, critical, and narrative--we will have little success in promoting such thinking in teacher education programs. Long-term research programs similar to CITE are invaluable in developing such a deeper understanding. But, we have a long way to go before we understand this complex and mystifying new paradigm of reflective thinking.

References

Adderholt-Elliott, M. (1987). Perfectionism: What's so bad about being too good? Minneapolis: Free Spirit Press.

Anderson, R.C. (1984). Some reflections on the acquisition of knowledge. Educational Researcher, 13, 5-10.

Berliner, D.C. (1986). In pursuit of the expert pedagogue. Educational Researcher, 15(7), 5-13.

Borko, H. & Livingston, C. (1989). Cognition and improvisation: Differences in mathematics instruction by expert and novice teachers. American Educational Research Journal, 26(4), 473-498.

Carter, K., Cushing, K., Sabers, D., Stein, P., & Berliner, D. (1988). Expert-novice differences in perceiving and processing visual classroom information. Journal of Teacher Education, 39(3), 25-31.

Clark, C. & Peterson, P. (1986). Teachers' thought processes. In M.C. Wittrock (Ed.), Handbook of research on teaching (pp. 255-296). New York: Macmillan.

Cochran-Smith, M. & Lytle, S.L. (1990). Research on teaching and teacher research: The issues that divide. Educational Researcher, 19(2), 2-11.

Colton, A.B., Sparks-Langer, G.M., Tripp-Opple, K., & Simmons, J.M. (1989). Collaborative inquiry into developing reflective pedagogical thinking. Action In Teacher Education, 11(3), 44-52.

Connelly, F.M. & Clandinin, D.J. (1990). Stories of experience and narrative inquiry. Educational Researcher, 19(4), 2-14.

Eisner, E.W. (1982). An artistic approach to supervision. In T.J. Sergiovanni (Ed.), Supervision of Teaching (ASCD 1982 Yearbook) pp. 53-66. Alexandria, VA: Association for Supervision and Curriculum Development.

Grinberg, J.G. (1989). Reflective pedagogical thinking in teacher education. Masters degree thesis, Eastern Michigan University, Ypsilanti, MI.

Hollingsworth, S. (1990). Teacher educator as researcher: An epistemological analysis of learning to teach reading. Paper presented at the annual meeting of the American Educational Research Association, Boston, MA.

Huberman, M. (1990). Linkage between researchers and practitioners: A qualitative study. American Educational Research Journal, 27(2), 363-392.

Joyce, B. & Showers, B. (1983). Power in staff development through research on training. Alexandria, VA: Association for Supervision and Curriculum Development.

Kagan, D.M. (1988). Teaching as critical problem solving: A critical examination of the analogy and its implications. Review of Educational Research, 58(4), 482-505.

Lampert, M. & Clark, C.M. (1990). Expert knowledge and expert thinking in teaching: A response to Floden and Klinzing. Educational Researcher, 19(4), 21-23.

Leinhardt, G. (1990). Capturing craft knowledge in teaching. Educational Researcher, 19(2), 18-25.

Leinhardt, G. & Greeno, J.G. (1986). The cognitive skill of teaching. Journal of Educational Psychology, 78(2), 75-95.

McLaren, P. (1989). Life in schools. New York: Longman.
Morris-Curtin, K. (1990, Spring). Teacher reflection and empowerment. MCSD/SI Newsletter, 5.
Piaget, J. (1978). Success and understanding. Cambridge, Mass: Harvard University Press.
Richert, A. (in press). Using teacher cases to enhance reflection. In A. Lieberman (Ed.), Staff development (2nd Ed.). NY: Teachers College Press.
Ross, D.D. (1990). Programmatic structures for the preparation of reflective teachers. In In R. Clift, W.R. Houston, & M.D. Pugach (Eds.), Encouraging reflective practice in education (pp. 97-118). New York, NY: Teachers College Press.
Schon, D.A. (1983). The reflective practioner. New York: Basic Books.
Schon, D.A. (1987). Educating the reflective practitioner. San Francisco: Jossey-Bass.
Shulman, L.S. (1987). Knowledge and teaching: Foundations of the new reform. Harvard Educational Review, 57(1), February, 31.
Simmons, J.M. & Sparks, G.M. (1985). Using research to develop professional thinking about teaching. Journal of Staff Development, 6(1), 106-116.
Smyth, J. (1989). Developing and sustaining critical reflection in teacher education. Journal of Teacher Education, 40(2), 2-9.
Sparks, G.M. (1983). Synthesis of research on staff development for effective teaching. Educational Leadership, 41(3), 65-72.
Sparks, G.M. (1988). Teachers' attitudes toward change and subsequent improvements in classroom teaching. Journal of Educational Psycyology, 80(1), 111-117.
Sparks-Langer, Simmons, J.M., Pasch, M., Colton, A. & Starko, A. (1990). Reflective pedagogical thinking: How can we promote it and measure it? Journal of Teacher Education, 41(4), 21-32.
Stallings, J. (1980). Allocated academic learning time revisited, or beyond time on task. Educational Researcher, 9, 11-16.
Tom, A.R. (1985). Inquiry into inquiry-oriented teacher education. Journal of Teacher Education, 36(5), 35-44.
Van Manen, M. (1977). Linking ways of knowing with ways of being practical. Curriculum Inquiry, 6(3), 205-228.

Table 1

Differences in the pretest and postest RPT Taxonomy scores by program participation

	Pretest (N=75)			Postest (N=63)		
Program	M	SD		M	SD	
CITE	2.94	.94		4.74	.65	
non-CITE	3.23	1.1		3.86	1.2	
Differences	t	df	p	t	df	p
	-1.21	73	.22	3.39	61	.01

Figure 1.

Mean change on the RPT Taxonomy scores between pretest to posttest for the groups

Table 2
T-tests of interviews

Paired t-Test X_1 : PRETEST Y_1 : INTERIM TEST

DF:	Mean X - Y:	Paired t value:	Prob. (2-tail):
89	.067	.387	.4996

Paired t-Test X_1 : POSTTEST Y_1 : PRETEST

DF:	Mean X - Y:	Paired t value:	Prob. (2-tail):
89	.336	1.956	.0536

Paired t-Test X_1 : FINAL TEST Y_1 : PRETEST

DF:	Mean X - Y:	Paired t value:	Prob. (2-tail):
43	.727	2.81	.0074

Note: 46 cases deleted with missing values.

Paired t-Test X_1 : FINAL TEST Y_1 : POSTTEST

DF:	Mean X - Y:	Paired t value:	Prob. (2-tail):
43	.432	2.265	.0286

Note: 46 cases deleted with missing values.

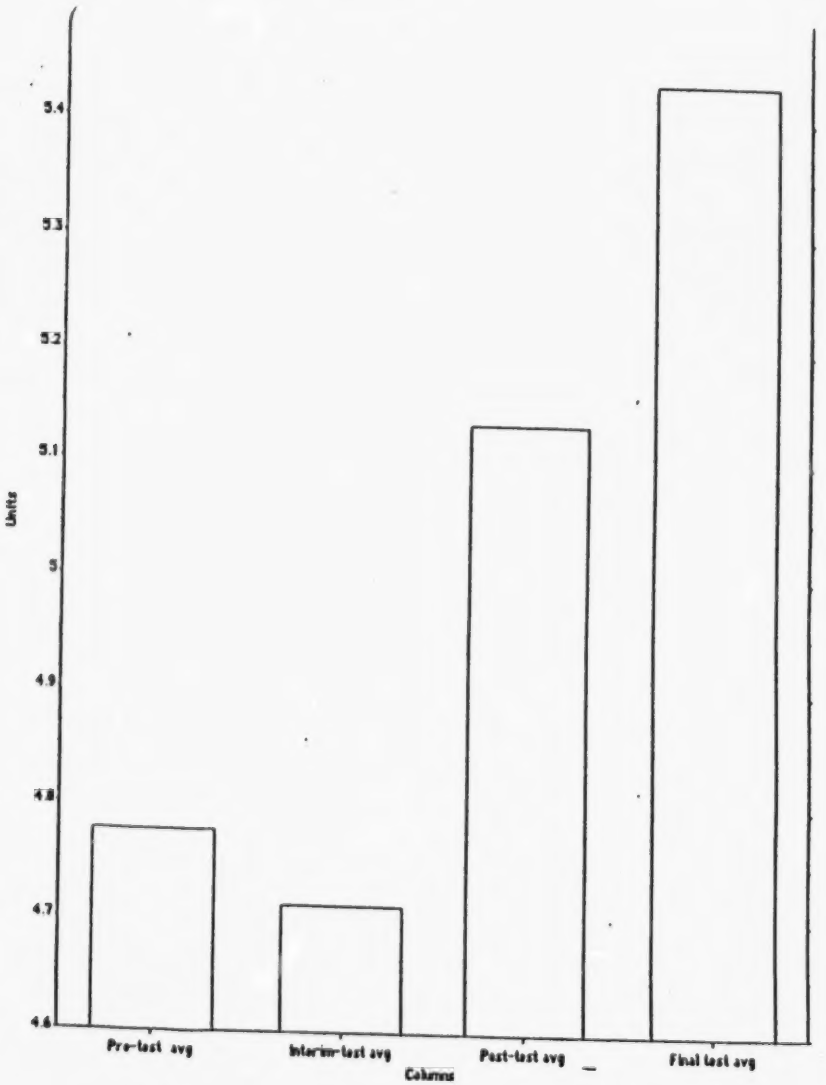

Figure 2. TAXONOMY AVERAGES PRE, INTERIM, POST AND FINAL INTERVIEWS

Appendix A

Reflective Pedagogical Thinking: How Can We Promote It and Measure It?

Georgea M. Sparks-Langer
Eastern Michigan University

Joanne M. Simmons
Michigan State University

Marvin Pasch
Eastern Michigan University

Amy Colton
Ann Arbor Public Schools

Alane Starko
Eastern Michigan University

The Collaboration for the Improvement of Teacher Education (CITE) is a pre-student teaching program that promotes students' reflective thinking about curriculum, methods, and sociopolitical issues through blocked classes and structured field experiences. The Framework for Reflective Thinking, a coding scheme, was developed to evaluate students' ability to reflect on pedagogical principles underlying teaching decisions, contextual factors affecting the application of the principles, and moral, ethical, or political issues surrounding a teaching experience. The initial evaluation indicated that CITE students were beginning to apply pedagogical principles in making teaching decisions. Above average students were able to adapt these principles to a specific context. Two additional studies indicated that CITE students showed significantly greater gains in reflection than other methods students not in the CITE program and that the Framework for Reflective Thinking could be used with experienced teachers to note changes in reflective thinking in a year-long staff development effort.

Aware that experience is not always a good teacher, proficient teachers search out other opportunities that will serve to cultivate their own learning. As savvy students of their own teaching, they know the value of asking others to observe and offer a critique of their teaching. They also know the value of writing about their work and of soliciting reactions from parents and students. Thus, masterful teachers develop specialized ways to listen to their students, colleagues, and administrators, and reflect on their teaching in order to improve their practice. (*Initial Policies and Perspectives of the National Board for Professional Teaching Standards*, 1989, p. 26)

What are the characteristics of reflective pedagogical thinking? How can we know if it is present? How can we develop it in teacher education programs? Our research group at Eastern Michigan University (EMU) has sought the answers to these questions since receiving a 3-year federal grant to use research in collaboration with local schools to improve teacher education (Sparks, Colton, Pasch, & Simmons, 1988). This article describes our discoveries as we have implemented and studied our pre-student teaching program to develop reflection. After a brief description of the program, we present the literature supporting our view of reflective thinking. Then we describe the Framework for Reflective Pedagogical Thinking, our coding scheme for analyzing reflective thinking, and the studies we have conducted at the preservice and inservice stages of teacher education.

CITE: Collaboration for the Improvement of Teacher Education

CITE's goal is to develop reflective pedagogical

Georgea M. Sparks-Langer, Associate Professor, Department of Teacher Education, Eastern Michigan University, Ypsilanti, MI 48197.

Joanne M. Simmons, Associate Professor, Department of Teacher Education, Michigan State University, East Lansing, MI 48824.

Marvin Pasch, Professor, Department of Teacher Education, Eastern Michigan University, Ypsilanti, MI 48197.

Amy Colton, Staff Development Consultant, Ann Arbor Public Schools, Ann Arbor, MI 48108.

Alane Starko, Associate Professor, Department of Teacher Education, Eastern Michigan University, Ypsilanti, MI 48197.

The authors specialize in research on teacher change and teacher thinking in inservice and preservice education programs as follows: Sparks-Langer, peer coaching and staff development; Simmons, supervisory judgements and teacher thinking; Pasch, program evaluation and social studies education; Colton, teacher thinking and decision-making, and Starko, gifted education.

The CITE project was funded by the Office of Educational Research and Improvement of the U.S. Department of Education. In 1987, CITE won the American Association of Colleges for Teacher Education Distinguished Achievement Award for using research in teacher education programs.

thinking in third- and fourth-year education students. Shulman (1987), in his "Model of Pedagogical Reasoning and Action," defined the process of reflection as "reviewing, reconstructing, reenacting and critically analyzing one's own and the class's performance, and grounding explanations in evidence" (p. 31). We believe reflective teachers are able to apply educational principles and techniques within a framework of their own experience, contextual factors, and social and philosophical values.

The program began with a planning year (1985-86) in which local teachers and administrators joined EMU faculty to (a) select research with powerful classroom implications and (b) design pre-student teaching field activities that would allow students to see how these ideas relate to everyday school life. The field experiences are part of an 8-credit block of three classes: Curriculum and Methods, Social Aspects of Education, and Measurement and Evaluation. During the 10 weeks of field experience, students complete four or five activities assigned by each of their professors. Students observe, experiment with, and/or analyze course-related principles. For example, in one activity students analyze the types and distribution of questions among students in light of teacher expectations research. At the end of the semester, students teach a week-long mini-unit designed with the assistance of their professors and teachers. Each night of this week, they complete a journal with guided questions that prompt reflection on the actions and issues of the day.

CITE was pilot tested with two blocked sections—one elementary and one secondary—during 1986-87. We assessed program implementation and outcomes in four CITE sections (approximately 100 students) during 1987-88. We have continued to study students in the program during the past 2 years. Teachers and administrators continue to be involved in the monitoring and modification of CITE activities as the program continues under EMU's funding.

One of our greatest challenges is to help students apply research recommendations thoughtfully rather than follow them blindly. Even the most powerful research can be misused when it is applied in an absolute, rule-bound fashion, without regard for context or values.

Reflective Pedagogical Thinking

As we continued our investigations of the CITE program, each of us on the research team read different literature related to teacher thinking and reflection: Van Manen (1977), cognitive psychology (e.g., Leinhardt & Greeno, 1986), experiential learning theory (Kolb, 1984), and Schon (1983, 1987). These diverse but influential ideas are described below, with examples of how they have been integrated into the CITE program.

Types of Reflection

Van Manen (1977) proposed that reflective thinking occurs in three stages similar to those described by Zeichner and Liston (1987). In "technical reflection," the teacher considers the best way to reach an unexamined goal; in "practical reflection," the teacher examines the means *and* the end (goals) by asking questions such as "What should we be learning?" In "critical reflection," the moral and ethical issues of social compassion and justice are considered along with the means and ends.

The integration of ideas across the three blocked CITE courses allows students to function at all three levels of reflection. In the Curriculum course and the Measurement course, students initially focus on the more technical and practical aspects of teaching. After all, that is where their concerns tend to be (Fuller, 1969); they want to know how to plan lessons, manage students, and create tests. An important goal of CITE, however, is to expand this limited vision of teaching. Thus, as students learn the technical skills of teaching, they also examine the worth of a lesson's goals and the moral and political assumptions underlying various approaches.

In the Social Aspects course, CITE students discuss the social context within which schools operate, question the long-term effects of their actions on societal values, critique various philosophical views of schooling, and examine issues of bias and equity. The challenge is to help students see how these issues relate to everyday teaching.

One way to help students move beyond the purely technical is to create field activities that require students to use ideas from all three courses. For example, in the Measurement course, CITE students create a sociogram to measure students' social rela-

tions. In the Social Aspects class, this information is used to discuss power and equity in schools. In the Curriculum course, students use this information to form cooperative groups designed to reduce inequities in the classroom. This crossover activity helps students see that grouping decisions have many important social and moral implications.

Cognitive Psychology

One goal of a structured field experience is to allow students to connect the concepts and principles from their courses with the reality of the classroom. It is hoped that students will use this information to make more thoughtful and appropriate decisions. As this goal became clearer, we looked to cognitive psychology for guidance on how to develop teachers' thinking and decision making.

Studies of novice and expert teachers (e.g., Berliner, 1986; Leinhardt & Greeno, 1986) have indicated that the mental networks of meaning (schemata) of experts are more complex than those of novices. An expert's network includes more categories, greater detail, and more interconnections than does the network of a novice teacher. When confronted with a problem situation or decision, experts can draw on this rich source of previously learned patterns and information and thus can make more appropriate decisions. Novices, in contrast, can produce fewer interpretations and possible alternatives in a given situation.

For example, a novice teacher, Mr. George, may make incorrect assumptions about a student, Mary, who is daydreaming during a questioning activity. Mr. George may decide Mary is lazy or "just doesn't want to work." The experienced teacher, however, may reach into a richer network and consider several interpretations. Mary may not have had breakfast, or she may be worrying about a personal problem. Mr. George did not consider these contextual factors, probably because of lack of experience with such students. The veteran teacher, however, has had years of experiences with various types of students and has formed patterns that allow him to more accurately assess what is going on.

One way to enrich a prospective teacher's schemata is to learn about a concept or principle (Gagné, 1968) in the college course and then to observe examples or experiment with it in the classroom. For example, CITE students study principles of memory and information processing. They also learn active participation methods (e.g., the use of wait time, group response, discussion, and voting) for encouraging understanding of material. Then the students observe and label instances of active participation on videos and in their field placement. They also experiment with these strategies during microteaching simulations and in classroom teaching. A student with such multiple experiences linked to the ideas of "information processing" and "active participation" should have easier access to these concepts and a richer network of meaning on which to reflect than one whose exposure is limited to a lecture or reading.

Experiential Learning Theory

A third influence on our view of reflection is experiential learning theory (Kolb, 1984), as it relates to Schon's (1983, 1987) view of the reflective practitioner. Kolb emphasized a cyclical relationship among four modes of learning: (a) concrete experience, (b) reflective observation, (c) abstract conceptualization, and (d) active experimentation. This framework reflects the stages of problem framing, factor naming, interpretation, analysis, synthesis, and evaluation that Schon used to describe reflective practitioners. It also provides a valuable guide to developing richer, more meaningful schemata in new teachers.

The CITE field experiences allow the student to begin this cyclical process. After learning about concepts or strategies in the three college courses, students have the opportunity to use (or see others use) the ideas in practice. They then observe the results of these actions and use abstract concepts and principles to interpret and analyze *why* things turned out as they did. Finally, they form a tentative hypothesis and may have the opportunity to test it in the classroom.

Take the idea of teacher expectations as an example. A CITE student, Rita, has learned that students for whom teachers have higher expectations tend to have greater opportunity to learn and receive more teacher attention. This, in turn, may result in higher achievement—a self-fulfilling prophecy. Rita has also learned that one way to provide higher expecta-

tions for all students is not to call on volunteers every time a question is asked but rather to ask the question, wait, and then call on a student whom she has selected. The next day, Rita includes this "wait time" technique in her lesson (concrete action). She observes that pupils are uncomfortable and reluctant to participate. Her higher expectations are resulting in lower participation and success, yet her courses have taught her that students should participate more when this technique is used.

Rita now begins what Schon (1987) calls "framing" the problem. She goes into her admittedly lean schemata of knowledge to begin to conceptualize and analyze the *why* of this event. She considers what she knows about the context and background of the situation. She considers that perhaps the students have had little prior experience with such questioning techniques. After all, an unwritten rule in most classrooms is not to call on a student who does not have his hand up.

She then "hooks into" another idea, that of proactive management (Evertson & Emmer, 1984). She recalls that pupils need to be taught how to act during common classroom routines, in this case, questioning. She forms a tentative hypothesis: Because of lack of experience with wait time, these students need to be taught how to respond when she asks questions in this way. Next, Rita goes to the class prepared to test out her hunch. She teaches the pupils about wait time by explaining the technique, modeling, and giving them practice with simple questions. Now we are back at the beginning of the cycle—concrete action, which will be followed by observation, conceptualization, and further experimentation and refinement.

Putting It All Together

In CITE, guided experimentation and analysis in simulation and field experiences help future teachers develop a reflective stance toward puzzling situations and everyday decisions. One of the earliest field assignments requires students to teach a lesson and write in a reflection journal what they did, why they thought it was successful or unsuccessful, and what they learned from the experience. Each night of the teaching week, CITE students complete a more detailed reflection journal where they identify one successful and one less successful event of the day. For each event, they write out why the activity was successful or not, what conditions were important to the outcome, and what moral or ethical issues were raised by the event. Such writing and discussions help students form the habit of reflective observation, conceptualization, and experimentation.

We believe that asking the question "why?" is crucial to the development of reflection in beginning teachers. Without explanatory principles for classroom successes, it is unlikely that one can increase the likelihood of those successes. If students do not understand why something did not work well, they have difficulty figuring out what to do next. At the practical and critical levels of reflection, asking why? is even more important. Why are we studying this? Why do we do something this way and not another way? Why are we presenting this point of view? Why will one strategy promote a greater sense of equity or empowerment than another one?

Through asking questions that provoke reflection, CITE students begin to see the importance of context: that a technique does not "live" in isolation from the content, the student's background, and the surrounding world. As a result, these future teachers may make more flexible, sensitive, and appropriate decisions. Experimentation with teaching strategies and learning principles, problem framing and analysis, reflective writing, and discussion all help enrich the reflective capacities of the new teacher.

Evaluation Study

The development of a Framework for Reflective Pedagogical Thinking has been one of the most significant outcomes of the CITE program. The Framework grew out of our efforts to evaluate CITE students' reasoning about classroom and school events. During 1987, we joined with teachers to design and pilot test an interview schedule and various forms of "think aloud" reflection journals to be used during the teaching week. Then, in 1988, we evaluated the outcomes of the CITE project.

Measurement of Reflective Pedagogical Thinking

At the end of winter semester, 1988, each of the four curriculum professors selected two lower-achieving, two middle-achieving, and two higher-

achieving students from their CITE block courses. This judgment was based on students' course work during the semester. In April, 1988, we collected data from these 24 students—12 elementary and 12 secondary.

At the end of the teaching week, each student was interviewed for about 15 minutes. They were asked to identify a particularly successful teaching event, to describe why they thought it was successful, and to discuss any conditions that may have influenced the outcome. Finally, they were asked to describe any issues or concerns that came to mind as they thought about this successful event. In the second half of the interview, the questions were repeated, but with the student analyzing a less successful teaching event.

During the teaching week, students also completed a reflection journal each evening after teaching. They were asked to describe in writing three instructional events from that day. For each, they were to identify where they had learned the idea and to discuss what factors influenced the outcome. Finally, students were asked what they would do differently and why.

We used the data from the fall pilot test of the interview to develop a coding scheme, which resulted in the Framework for Reflective Pedagogical Thinking. The Framework is based on our belief that analysis of students' language can shed light on their ability to use concepts and principles to explain classroom events. The levels in the coding scheme mirror Gagné's (1968) hierarchy of thinking and Van Manen's (1977) idea of critical reflection.

The Framework presented in Table 1 distinguishes among seven types of language and thinking. Level 1 is the lowest, with no description provided. Level 2 involves a simple layperson's description of the instructional event, for example, "She used groups." At level 3, the student can label events using pedagogical concepts: "She used cooperative groups." Level 4 involves an explanation of an event using tradition or personal preference: "We always use reading groups." Level-5 thinking requires an explanation of an event using pedagogical principle(s): "Interdependence in group work helps build a desire to help others learn; this sink-or-swim feeling keeps students committed to their own learning and that of their peers." At Level 6, the explanation includes contextual factors such as student characteristics, subject matter, or community factors: "In this class, students' social groups are generally formed along economic lines. Cooperative learning is especially useful in such situations because it provides repeated positive experiences with children from different backgrounds." At level 7, the explanation includes consideration of moral, ethical, or political issues: "Cooperative learning is being used here because there is a split along economic lines in this community and we want students to accept and value each other in spite of these differences. Such values may contribute, in the long run, to saving this planet."

Table 1
Framework for Reflective Thinking

Level	Description
1	No descriptive language
2	Simple, layperson description
3	Events labeled with appropriate terms
4	Explanation with tradition or personal preference given as the rationale
5	Explanation with principle or theory given as the rationale
6	Explanation with principle/theory and consideration of context factors
7	Explanation with consideration of ethical, moral, political issues

Two members of the research team used the Framework to code the interview transcripts. Two other members coded the reflection journals. All coding was done independently and with no knowledge of student identity or classification. Using a one-level difference in codes as acceptable, the two raters' interview scores matched in 81 percent of the cases. Reliability was less satisfactory for the journal data, possibly because the questions in the original journal format did not elicit the kind of thinking we were coding. The journal has since been refined to more closely parallel the levels of reflection in the Framework.

Results

The demographic and interview data are presented in Table 2. Means were computed by averaging all

scores of both coders. As can be seen, students were functioning at levels 2 through 7 on the Framework. The overall mean rating was 4.48 ($SD = 1.15$) on the 7-point scale. This average indicates that principled pedagogical thinking (Level 5) was just beginning to emerge in many of the pre-student teachers studied.

Table 2
Demographic Characteristics and Reflective Pedagogical Thinking Scores in Three Categories of Course Performance

				Reflective thinking scores	
Group	Subject	Gender/ age	GPA	Positive event	Negative event
High	235	F/26	3.28	4.4*	5-5
	288	F/26	3.91	5-6	5-5
	991	F/25	2.99	5-6	5-3
	289	F/31	3.58	6-6	7-6
	615	F/40	3.54	5-5	5-5
	175	F/34	3.14	5-4	4-6
	519	F/39	3.38	6-6	6-6
	828	M/25	3.30	5-5	4-5
M		30.75	3.39	5.16	
SD		6.27	.29	.64	
Average	951	F/22	2.74	5-6	5-5
	029	F/31	3.24	5-6	6-6
	733	M/35	3.29	5-4	5-5
	649	F/22	2.85	5-4	5-4
	163	F/21	3.21	5-5	5-5
	653	F/36	3.23	5-4	5-6
	253	F/24	2.62	3-6	4-6
	564	M/21	2.67	3-5	3-6
M		26.50	2.98	4.91	
SD		6.43	.29	.46	
Low	899	F/22	2.13	4-4	2-5
	663	M/30	2.48	3-4	2-5
	993	M/21	2.27	5-6	5-5
	459	M/23	2.30	2-2	2-2
	190	M/22	2.81	3-4	4-4
	834	F/24	2.98	3-5	2-2
	990	F/21	2.30	2-3	2-2
	127	M/22	2.42	3-4	3-4
M		23.13	2.46	3.38	
SD		2.95	.29	1.01	

*Scores for both coders are provided.

The high, average, and low subgroup results are enlightening. We selected students at three different achievement levels to ensure variability in the interview sample. We also expected that students with lower course achievement would have more difficulty applying the course concepts and principles than would higher-achieving students. As can be seen in Table 2, the average interview scores for the low (3.38), middle (4.91), and high (5.16) groups parallel their achievement ratings. A one-factor analysis of variance resulted in a significant between-group difference $F(2,21) = 13.61$, $p = .002$), indicating that the achievement level influenced students' performance on the reflective thinking interview.

One student (ID 993) surprised us all with his lower course performance and high interview scores. As we considered other data, we found he had a low GPA and that his journals were not particularly reflective. One of his CITE professors described him as "able to sound as if he understood the ideas but unwilling to do the work required to apply the ideas accurately in his course work." In this case, at least, our interview and framework may not have provided an accurate assessment of reflective thinking.

Among the average and high achievers, all 16 were able to describe teaching events using course principles (Level 5). A typical comment illustrating Level 5 is "[It's important to] provide variety in my presentations. On the first day, I used a lecture with a few questions. Students were tuned out. As I thought about it, I decided that perhaps I wasn't appealing to their various learning styles. So, the next day, I had more visual aids and active involvement. They were much more attentive and learned more from it."

Seven of the 16 average and high achievers demonstrated conditional/contextual thinking (Level 6). A typical Level-6 comment illustrates a sensitivity to individual differences: "[In Spanish class I had] participation between three students at a time so the other two could hear and get some learning from the listening process. But I overestimated their ability to listen, and I didn't realize that some students were so timid about speaking about something we were just recently learning. I think these timid students will need more choral practice in the large group before I put them in small groups."

Because over 90% of all CITE students are in the medium- to high-achieving category, this result was encouraging. Students appear to be meeting the program goal of using pedagogical principles and some contextual information to analyze teaching events, but only one student was thinking about the equity and justice issues at Level 7. Other researchers seeking to develop critical reflection (e.g., Putnam & Grant, in press) have had similar results.

There are at least four explanations for this outcome. First, when they were interviewed, these pre-student teachers were concerned with the more technical aspects of the teaching week. This is logical, because it was their first significant teaching experience, and, as beginners, they were focusing on "how to do it." Fuller's (1969) theory of teacher development indicates that most beginning teachers are concerned with survival, as were our CITE students.

A second reason for less attention being given to the ethical aspects of teaching may relate to the incidents the students selected to discuss in the interview. Some events lend themselves more readily to critical social interpretations than do others. For example, a student who chooses to focus on the effects of grouping strategies may more readily see ties to social values than one who discusses effective use of visual aids.

Third, it is possible that our interview questions did not adequately tap students' thinking about moral aspects of their teaching. The final question focused on "other issues or concerns you found yourself thinking about." We have been working on refining this question to more specifically elicit a critical perspective. Finally, it is possible that the CITE professors did not teach or model a critical social view of teaching methods. In this case, one would not expect the students to demonstrate such thinking.

Other Studies

We are encouraged by these results and have used our interview procedure and Framework for Reflective Pedagogical Thinking in two other studies. First, we conducted a comparison-group study (Grinberg, 1989) to contrast growth in reflective thinking in a group of 37 elementary and secondary CITE students with a group of 42 students taking the Curriculum and Methods course, but not in the CITE program. In place of the interview about the teaching week, all students were asked to respond in writing to videotaped sequences of classroom teaching. They were asked to describe the event, refer to educational ideas involved in the event, and make a generalization about the event related to other teachers, classrooms, or students.

Both groups scored similarly on the beginning-of-the-semester measure of reflective thinking ($M = 2.94$ $SD = .94$; $M = 3.23$ $SD = 1.1$; $t = 1.21$, $p = .22$). By the end of the semester, the CITE students scored significantly higher ($M = 4.74$, $SD = .65$) than did the non CITE students ($M = 3.86$, $SD = 1.2$; $t = 3.29$, $p = .01$). Thus, it appears that the CITE courses with structured pre-student teaching activities and a teaching week were more effective in promoting students' reflective thinking than were courses without structured field experiences.

In a second study, we examined reflective thinking outcomes in a staff development program based on the ideas of Madeline Hunter (1976). The research was part of a larger study of an inservice program in two public elementary schools in Grand Rapids, Michigan (Pasch et al., 1990). The first year included 36 hours of training followed by an average of 8 peer coaching sessions for each teacher participant.

To assess the effects of the training on teachers' thinking, we interviewed 15 teachers using questions matched to each level of the Framework for Reflective Pedagogical Thinking. The interviews were conducted on three separate occasions: September, 1988, prior to the training; January 1989, after training, but before coaching; and June 1989, after coaching. Pre- and posttraining behavioral observations of teaching indicated a positive change in the use of the techniques taught, especially in mathematics lessons.

The interviews were coded blindly by six members of the research team using the Framework. There was no significant difference between the pretraining ($M = 4.78$, $SD = 1.44$) and posttraining ($M = 4.71$, $SD = 1.1$) scores for reflective pedagogical thinking. The third interview, after the coaching, yielded a mean score of 5.13 ($SD = 1.03$). This represented a significant ($p = .02$) positive change in the teachers' reflective pedagogical thinking, suggesting that the

impact of the staff development program was substantial.

There are at least two explanations for this finding. First, the effects of the training may be cumulative; that is, it may take time for changes to become apparent in a teacher's instructional thinking. Second, the discussion and analysis of instructional issues during the coaching sessions may have allowed the teachers to bring more meaning to the training ideas, thus enhancing their reflective thinking. If the latter is true, this research provides new insight into studies by Showers (1985) and others (e.g., Sparks & Bruder, 1987) of the effects of peer coaching on the transfer of training. Coaching may be effective, because it helps teachers become more reflective thus enabling them to use training recommendations in a flexible and sensitive manner.

Current Insights and Future Directions

Our odyssey into reflective teacher thinking has brought us many insights. The first of these is a reconceptualization of our framework. The other insights relate to program improvement. Through our research, we have been able to gain a more specific understanding of our program outcome—reflective pedagogical thinking. We now have a clearer vision of how we expect students to use course concepts, techniques, and principles. This clarity has led us to modify our courses, our work together as professors, and our work with teachers.

Reframing the Framework

As we have continued to collect and analyze data on teachers' thinking, we have begun to question the linear nature of our Framework. Some teachers jump immediately to the ethical and moral aspects of teaching but cannot analyze discrete events in terms of pedagogical concepts or principles. Others seem stalled at the technical level, with little concern about the larger sociopolitical issues. As a result, we have begun to experiment with a dual coding scheme, with one score for technical thinking and another for ethical/moral thinking. This results in a profile that when compared to a single score, may describe reflection more fully.

Course Modifications and Interdisciplinary Teaching

As a result of our deeper understanding of reflection, we have modified our courses substantially. First, the Curriculum and Methods professors have collaborated to specify the concepts and principles of teaching and learning that will be emphasized; this partnership has led to the publication of a methods textbook (Pasch et al., 1990). As we identified the important ideas, we were able to design course and field assignments that allowed students to use the core ideas in reflective journals and discussions. For example, during in-class microteaching, students observe a peer teacher's lesson, looking for evidence of instructional principles. Then the "teacher" uses this feedback to write an analysis of the lesson in a reflection journal. We are also using more case studies and discussions of *why* something works or does not work.

We have learned that the content in our CITE block needs to be integrated across courses. We have accomplished this through a cohort system in which the same group of students shares the same three professors. This has allowed the professors to work together to design interdisciplinary topics and assignments (for example, the sociogram assignment referred to previously). Another assignment is the viewing and discussion of segments of three movies that illustrate three approaches to motivation, power, and discipline in the classroom. All three professors share in the class discussion to show how various perspectives can coexist. Through such activities, students have begun to see that the ideas and techniques taught in the measurement, methods, and social foundations courses are intimately interrelated.

This collaboration among professors has brought us a deeper appreciation of the importance of social foundations in teacher preparation. This course provides an understanding of the social and political context of education, which has a powerful effect on what happens in the classroom, as we all know. What we did not fully appreciate was the effect that classroom methods can have on the social and political values pupils form. Our critical theorist colleagues (see McLaren, 1989) have helped us see that the choice of a teaching strategy may have powerful long-term effects on society. For example, a mostly lecture style communicates one message about au-

thority and power; a cooperative learning method illustrates a different conception of power. Critical reflection on such issues should not be left out of methods courses.

Work with Teachers

Our clearer, more specific vision of reflective thinking has allowed us to communicate to all participants what we are trying to accomplish in CITE. We have returned to a second planning phase as we have asked teachers to join with us to examine the idea of reflective decision making and propose new directions for CITE. Amy Colton, a former CITE teacher and our 1988-89 CITE Director, initiated a seminar for this purpose (see Colton, Sparks-Langer, Tripp-Opple, & Simmons, 1989). The six monthly sessions produced two writing and conferencing tools to develop reflection in CITE students. As a result of this collaboration, we now offer a 2-credit seminar, "Supervising Student Teachers for Reflective Decision Making," with one free credit provided for CITE teachers.

Conclusion

Clearly, professional inquiry is worth the time and effort. Our research into the development of reflection has helped us refine our own thinking and, thus, our entire program. We are certainly not confident that we have found the only or even the best definition of reflection. We do know, however, that this research path has led us to a specific vision that allows us to make practical and reasonable improvements in our programs. Undoubtedly, our future evaluation will lead us to more insights and improvements as we strive to promote reflective pedagogical thinking in teachers.

References

Berliner, D. C. (1986). In pursuit of the expert pedagogue. *Educational Researcher, 15*(3), 5-13.

Colton, A. B., Sparks-Langer, G. M., Tripp-Opple, K., & Simmons, J. M. (1989). Collaborative inquiry into developing reflective pedagogical thinking. *Action in Teacher Education, 11*(3), 44-52.

Evertson, C., & Emmer, E. (1984). *Classroom management for elementary teachers.* Englewood Cliffs, NJ: Prentice-Hall.

Fuller, F. F. (1969). Concerns of teachers: A developmental characterization. *American Educational Research Journal, 6*, 207-226.

Gagné, R. M. (1968). Learning hierarchies. In M. D. Merrill (Ed.), *Instructional design: Readings* (pp. 118-131). Englewood Cliffs, NJ: Prentice-Hall.

Grinberg, J. G. (1989). *Reflective pedagogical thinking in teacher education.* Unpublished Master's thesis, Eastern Michigan University, Ypsilanti, MI.

Hunter, M. C. (1976). *Rx improved instruction.* El Segundo, CA: T. I. P. Publications.

Initial policies and perspectives of the National Board for Professional Teaching Standards. (1989). National Board for Teaching Standards, Detroit, MI.

Kolb, D. A. (1984). *Experimental learning: Experience as the source of learning and development.* Englewood Cliffs, NJ: Prentice-Hall.

Leinhardt, G., & Greeno, J. G. (1986). The cognitive skill of teaching. *Journal of Educational Psychology, 78*(2), 75-95.

McLaren, P. (1989). *Life in schools.* New York: Longman.

Pasch, M., Arpin, T., Kragt, D., Garcia, J., Harberts, J., & Harberts, M. (1990, January). *Evaluating teachers' instructional decision-making.* Paper presented at the meeting of the Michigan Educational Research Association, Novi, MI.

Pasch, M., Sparks-Langer, G., Gardner, T., Starko, A., & Moody, C. (1990). *Teaching as decision making.* New York: Longman.

Putnam, J., Grant, S. G. (in press). Reflective practice in the Multiple Perspectives Program. In L. Valli (Ed.), *Reflective teacher education programs.* New York: Teachers College Press.

Schon, D. A. (1983). *The reflective practitioner.* New York: Basic Books.

Schon, D. A. (1987). *Educating the reflective practitioner.* San Francisco: Jossey-Bass.

Showers, B. (1985). Teachers coaching teachers. *Educational Leadership, 42*, 43-48.

Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review, 57*(1), 1-32.

Sparks, G. M., & Bruder, S. (1987). Before and after peer coaching. *Educational Leadership, 44*, 54-57.

Sparks, G. M., Colton, A., Pasch, M., & Simmons, J. M. (1988). *CITE project assessment report*, OERI Contract No. 400-85-1052. Ypsilanti, MI: Eastern Michigan University.

Van Manen, M. (1977). Linking ways of knowing with ways of being practical. *Curriculum Inquiry, 6*, 205-228.

Zeichner, K. M., & Liston, D. P. (1987). Teaching student teachers to reflect. *Harvard Educational Review*, 57(10),23-48.